Résumés des projets du Cycle CESPROMIN 2010 / 2011

ALMADANI Mohammad Ahmad
SAUDI ARABIA

INTRODUCTION OF TECHNICAL AND ECONOMICAL ANALYSIS OF ENVIRONMENTAL FACTORS FOR MINING PROJECTS IN SAUDI ARABIA, CASES STUDY ON BAUXITE AND PHOSPHATE MINES

The booming of environmental studies and protection of environmental elements become majors' factor that will effects on mining projects in Saudi Arabia. Research subject focuses on the effects of environmental impacts and mining closure on the economics of mining projects. The specific objective is to provide the best position to integrate these costs into the calculations bankable feasibility to provide both a high success rate of mining projects and hence development of the mining sector in Saudi Arabia and also a reduction of environmental impacts of the sector. Saudi Arabia is the home of the large non-fuel mineral deposits. Mineral resources are abundant in the form of base and industrial minerals. The existing Mining Code includes limited references to environmental activities. In addition, limited environmental regulations exist for the Saudi mining industry. This approach can serve as basis for further legislative recommendations of the Saudi Mining Code. The technical aspects of this consideration for gold mines have already been studied in several reports. So the study focus on the cases of bauxite and phosphate mines. The technical and economical of environmental impacts is drowned from examples of mines in Saudi Arabia. In addition the specific financial or tax of the country will be examined and compared to other places. The environmental impacts of mining are related to industrial mining (ore mining method, process and mineralogy) and the physical environment of mining sites (climate, topography, land and use).

DIALLO Mamadou Ciré
GUINEE

ECONOMIC CONSIDERATIONS IN THE PRE-FEASBILITY STUDIES OF MONT NIMBA IRON ORE PROJECT – GUINEA - *CONFIDENTIEL*

The Mt Nimba Iron Ore Project is historic, and started in the 70's and due to political and environmental issues; it has not come out to date. SMFG which is a joint venture between MIFERGUI and EURONIMBA obtained the rights to update and develop Nimba project since 2003. Since then, a lot of work has been completed for exploration and modeling. Nimba current team is busy doing work for pre-feasibility studies and the project developed in this report consists normally of an economic part of those studies. Cash flow scenario and sensitivity analyses were also performed to check viability and risks for the project. The former is to consider pessimistic and optimistic cases around results of conventional study which is considered as base case. This project was therefore concluded as being economically viable despite few raised issues and few recommendations are given for perform next step of Mt Nimba Iron ore Project.

GAMBIN Fernando
BRAZIL

MINERAL PROPERTY VALUATION: A COAL MINING PROJECT AS CASE STUDY

There are many reasons for conducting studies on estimating the value of a mineral asset or mining property. Mining valuations are sometimes required for fairness opinions, condemnation proceedings, litigations, taxations purposes, financial analysis, mergers & acquisitions, and shareholders related matters. In Brazil, The National Department of Mineral Production (DNPM) can be asked about the fair value of a mineral property to be used as financial guarantee or even in a lawsuit. Depending on the purpose of the valuation, the process will follow certain approach or will have some specific constraints. A number of countries have introduced codes governing the valuation of mineral assets and securities. The methodologies used in valuing a mineral asset differ depending on the developmental stage of the project i.e. exploration, development and production properties. The main codes present as the three generally accepted valuation approaches, the Cost, the Market and the Income Approaches. The methods related to each approach are discussed. Considering a coal deposit situated in the South of Brazil, the valuation of the Cruz de Malta mining project was performed considering the methodologies presented for mineral asset valuation. The Income approach using the Discounted Cash Flow Analysis was chosen as the most suitable methodology for the case study. The analysis resulted in a project value of 12,5 MUS$ for the Cruz de Malta Mineral Asset. The sensibility analysis in the DCF shows that uncertainty in some key input parameters resulted in different values for the project. Depending on the purpose of the valuation, the technical value generate by the income approach is used as basis for determination of a fair market value.

GLENN ROTTY
INDONESIA

THE SENSITIVITY ANALYSIS OF BIG GOSSAN STOPING MINE - INDONESIA

The Big Gossan Underground Mine is the one of underground mines in East Estberg District of Irian Jaya West Papua, Indonesia. This mine applies open stoping with back filling method. Total initial capital in this project is 546 million USD and the production of this mine has already started in June 2010 and it is scheduled to achieve 7000 tons of ore per day in 2013. This underground mine is located on level 2480 to level 3180 and connected by inter level ramp. In order to support mine production, by year 2011 PT Freeport McMoran Indonesia builts production shaft, Jaw crusher equipment, underground offices, underground magazine and filling material plant. The purpose of sensitivity study is to describe the value of this mine project (NPV and IRR) base on the variability value of operating cost, dilution, mill and mine recovery, grade and production and the metal price. The understanding of sensitivity analysis will be useful for mine planning from the economic side of view and also to identify those factors that most greatly affect in this mine project.

GONCALVES CARDOZO RIBEIRO Breno
BRAZIL ***CONFIDENTIEL***

PRE-FEASIBILITY PROJECT OF IMPLEMENTATION OF CONVEYOR BELTS IN IRON ORE MINE STUDY CASE : FÁBRICA MINE – VALE

This work is a pre-feasibility study with the objective is the implementation of conveyor belt to mine iron ore. The mining operating costs of Vale have a tendency to increase in coming years. This increase is related to the rising price of labor, fuel, tires, and maintenance and transport distances. The environmental impacts should also be reduced. The present system uses big trucks for the ore transport presenting high operating costs. The average distance of the mine is 4.7 km. The option to study the implementation of the conveyor belt in João Pereira mine is due to the large volume handling of this mine over its useful life. This mine will be the leading supplier of ROM for the refurbished plant from 2018. The results show that implementing a conveyor belt for iron ore transporting is viable. This study showed big economic, environmental and safety gains, and combat the tendency of high operating costs in the near future.

KABORE Rasmane
BURKINA FASO

GEOLOGICAL MODELLING AND MINERAL RESOURCES ESTIMATE OF THE KIAKA DEPOSIT

The Kiaka deposit is property of Kiaka Gold Sarl, subsidiary of Canadian based company, Volta Resources Inc. The exploration licence covering a total area of 244 km^2 has been explored by Randgold Resources Limited and Volta Resources for gold and precious metals. The present study is based on 189 Diamond and Reverse Circulation drillholes totalizing 30872.59 m : 35 drillholes for 8083 m drilled by Randgold Resources Ltd and 154 drillholes 22789.59 m drilled by Volta Resources Inc. Kiaka is hosted by amphibolites and quartz-mica schists of the Tenkodogo Greenstone Belt. There is thin transported surface cover and artisanal spoil and oxidation has affected only the upper 20 to 30 m of the underlying geology. The deposit has been interpreted as a north striking shear bounded corridor within which gold mineralisation is concentrated in subvertical curvi-planar structures. The mineralised corridor is some 100 to 200 m wide and has a drill defined strike length of just over 1 km; it is flanked by a number of sub-parallel mineralised structures some 10 to 30 m wide. The estimate is based on a combination of diamond core and RC chip samples which were fire assayed for gold by ALS laboratory in Ouagadougou. Field rejects from the mineralized intersections of the RRL RC drillholes have been re-sampled and included in Volta's assay database; comprehensive QAQC has demonstrated that sample preparation and laboratory performance for both drilling campaigns provided assays which are fit for the purpose of this estimate. Density determinations by water immersion give a well informed assessment of density by rock type. Drillhole orientations are between -50 and -60 degrees predominantly to the east with regular scissor holes to the west, are typically collared 50 to 100 m apart along section lines which are spaced at 50 m intervals through the main part of the deposit. A block model of 20 x 20 x 5m has been created into which gold grade has been estimated using an ordinary kriging routing.

KAROLUS SANTOSA
INDONESIA

ECONOMIC EVALUATION OF LIGNITE OPEN PIT COAL MINE EAST KALIMANTAN – INDONESIA

Lignite Coal Project is located near Bengalon River and it is in the middle of PTKPC CCoW (Coal Contract of Work) lease area at East Kutai Regency, East Kalimantan Province. This project is one of the potential areas for lowest calorific value (4000 – 4500 kcal/kg – GAR) in Exploitation Mining Concession of PT. Kaltim Prima Coal. The deposit contains four groups of main coal seam of approximately 109 million tonnes coal reserve, with coal quality of 4000 up to 4625 kcal/kg (GAR) at stripping ratio of 3.67 / 1. The coal seam is part of Balikpapan formation of Middle Miocene – Late Miocene age. The main geological structure coal deposit is syncline and anticline affected by volcanic intrusion. Final pit limit will cover the area about 2970 ha including out pit dump area. The mining equipment are invested and operated by contractor. Coal production averaged per year will be 7.5 Million tonnes for 14 years LoM. Based on the economic evaluation, this project is feasible and profitable to be carried out at the coal price 39.83 US$ per tonne FOB that may generate an Internal Rate of Return, the Net Present Value and Pay Back Period in 5.18 years.

MUHANDIS Mustafa
SAUDI ARABIA

SUKHYBARAT ECONOMICAL STUDY

The Sukhaybarat gold mine is located 550 km northwest of Riyadh in the Nuqrah as Safra area. This remote region is the center of historical gold and copper workings, which were discovered in the 1930s. The Sukhaybarat is just one of number of gold occurrences in this area. There is also Red Hill area containing small amount and high grade. Many prospects around Sukhaybarat are discovered during the exploration stage like Nuqrah, Shupah, Bulghah and Bulghah North. The gold mineralization in Sukhaybarat in shear zones is found in extensional fractures related to shear faulting. The host rock is either an intrusive whose emplacement was related to the structural movement or a meta-sedimentary rock that was affected by the thermal halo around the intrusion. The previous mine was established around 1990 until 2001 and extract about 8.5 Mt Ore by Swedish company. After that the mine closed but the plant is still working until now feeding from Bulghah high grade ore from 2002 until March 2009 after that the feeding was from Sukhaybarat low grade stockpile. In 2009 with the change in the price of gold, the geology department did new study of initial information available at the time and expense of the existing quantity to see the economic viability of this area and if it is possible to exploit or not. Then they make solid by sections from the old assay (exploration holes) which was drilled by exploration Swedish company and used in the mine after that they evaluated the resource about 4 Mton at average grade 1.5 g/t which is given by the block model. The ore zone is located in south area of the old mine nearest from waste dump. It's extended about 500 m NS and about 300 m EW and elevation about 160 m.

OCAMPO GARCIA Edgar Ferney
COLOMBIA ***CONFIDENTIEL***

EVALUATIONS TECHNIQUES ET ECONOMIQUES DU PROJET D'EXPLOITATION SOUTERRAINE DE GYPSE SUR LE SITE ACTUEL DE LA CARRIERE A CIEL OUVERT DE MAZAN

Lafarge Plâtres fait partie des leaders français du marché du Plâtre et de ses coproduits, issus d'exploitations de gypse dans des carrières souterraines ou à ciel ouvert. L'entreprise cherche à améliorer sa connaissance du gisement de gypse de Mazan dans le Vaucluse afin d'envisager la suite de son exploitation en souterrain.
Ce gisement est très important en épaisseur et constitue l'une des sources majeures de gypse pour la société Lafarge. Les réserves directement exploitables de gypse sur le site représentent l'équivalent de 6 années de production au rythme actuel. Au-delà de cette durée, la poursuite de la production ne peut être envisagée qu'en développant une nouvelle carrière ; celle-ci portera sur l'extraction de la partie nord-ouest du gisement extrait actuellement à ciel ouvert. Etant donné l'environnement de cette couche, située sous les verses à stérile, une telle exploitation est difficilement envisageable à ciel ouvert.

WANDI KAMAJAYA
INDONESIA

ECONOMIC EVALUATION OF CONSTRUCTION OF NORTHERN OVERLAND CONVEYOR OF PT KALTIM PRIMA COAL IN EAST KALIMANTAN

PT Kaltim Prima Coal is located in Sangatta, East Kalimantan Province Indonesia. PT KPC is a Coal Contract of Work (CCoW) first Generation Holder in Indonesia and has been operating since year 1991. The CCoW will expire in 2021 with possibility to extend by 2 x 10 years. An extension permit is being requested and is under reviewed by government of Republic of Indonesia. There are two main deposits under KPC lease area i.e. Sangatta and Bengalon

Deposits, both deposits are being mined through open pit mine. KPC - Sangatta deposit is located within the Miocene aged Balikpapan Beds of the Kutai Basin which extend from south of Sangatta through to north of Sangkulirang. Bengalon deposit is located some 30 kilometers to the north of Sangatta. PT KPC's coal resources in the Sangatta and Bengalon areas are 2 274 million tonnes (measured) and 2 049 million tonnes (Indicated), while coal reserve in total (Sangatta and Bengalon) are 940.3 MT with average stripping ratio of 8.17 / 1. Coal calorific values are ranged from around 6000 to 7500 kcal/kg, Air Dried Basis. Based on PT KPC's expansion plan, main targeted areas are moving toward western and northern of lease area. Following the expansion plan, PT KPC need to upgrade and construct new infrastructures to ensure that coal chain system capacity meets production target. This study evaluates economic feasibility of construction of new 10.8 km Overland Conveyor (OLC) from PT KPC's Northern area to main Coal Processing Plant to replace current coal transporting method using coal trucking. Total investment for the OLC project is US$ 174.4 million using loan to equity ratio of 75 : 25 with three years capital draw down period. Analysis of the project uses incremental cash flow method which calculates the difference between Overland Conveyor and coal trucking scenario cash flow. Both deterministic NPV calculation and Monte Carlo Simulation show that the project is attractive and feasible.